PHOTORECEPTORS PRACTICE TEST (SAMPLE)

STUDY GUIDE

SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

• Practice answering questions under realistic conditions,

• Improve accuracy and speed,

• Review explanations to strengthen weak areas, and

• Approach the exam with greater confidence.

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 – 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

Questions

1. In the center of the fovea, how many cones does each cone bipolar cell collect signals from?

A. One

B. Two

C. Three

D. Many

2. Which statement best describes the Purkinje shift?

A. Shift toward shorter wavelengths under scotopic

B. Shift toward longer wavelengths under scotopic

C. No shift

D. Shift in luminance

3. Which statement best describes cone photopigment distribution?

A. Cones contain rhodopsin

B. Rods contain cyanolabe

C. Cones contain cyanolabe, chlorolabe, and erythrolabe

D. Cones contain rhodopsin

4. Which photoreceptor type tends to have more photoreceptors connected to a single post-synaptic bipolar cell?

A. Cones

B. Both equally

C. Neither

D. Rods

5. Under photopic conditions, two 5-quanta flashes cause how many ganglion cells to reach threshold?

A. 1

B. 2

C. 3

D. 4

6. Which two cell types are the main contributors to the ERG signal?

A. Ganglion cells and Amacrine cells
B. Müller cells and RPE
C. Photoreceptors and bipolar cells
D. Photoreceptors and Ganglion cells

7. What is the approximate threshold potential commonly cited for triggering an action potential in neurons?

A. -70 mV
B. -40 mV
C. 0 mV
D. -50 mV

8. When light hits a rod, what substance absorbs the photons?

A. Photopsin
B. Rhodopsin
C. Retinal
D. Opsin

9. How is the spectral sensitivity function for scotopic and photopic vision obtained?

A. Sum of absorption spectra
B. Reciprocal of thresholds
C. Difference of thresholds
D. Product of thresholds

10. What do discs in rods and cones contain?

A. Nucleic acids
B. Photopigments
C. Lipids
D. Proteins

Answers

1. A
2. A
3. C
4. D
5. B
6. C
7. D
8. B
9. B
10. B

Explanations

1. In the center of the fovea, how many cones does each cone bipolar cell collect signals from?

A. One

B. Two

C. Three

D. Many

In the foveal center, vision is wired for the highest spatial detail by minimizing convergence. Each cone forms a direct, private line to its own cone bipolar cell, meaning one cone feeds one cone bipolar cell. This one-to-one wiring preserves precise location of the signal as it moves toward the ganglion cells, which is why the fovea has such sharp vision. Outside the center, signals from several cones are pooled into fewer bipolar cells, which increases sensitivity but reduces acuity. So, the number of cones per cone bipolar cell in the foveal center is one.

2. Which statement best describes the Purkinje shift?

A. Shift toward shorter wavelengths under scotopic

B. Shift toward longer wavelengths under scotopic

C. No shift

D. Shift in luminance

The main idea is how the eye's sensitivity to colors changes as lighting drops. In bright conditions, vision is dominated by cones and the peak luminance sensitivity sits toward longer wavelengths (green-yellow). As light fades, rods take over and their spectral sensitivity peaks at shorter wavelengths (blue-green). This makes the eye relatively more sensitive to shorter wavelengths in dim light, so colors like blue-green appear brighter compared to red objects. That's why the Purkinje shift describes a shift toward shorter wavelengths under scotopic (low-light) conditions. The other statements don't fit because they'd imply a shift to longer wavelengths, no shift at all, or a vague change in brightness rather than a change in spectral sensitivity.

3. Which statement best describes cone photopigment distribution?

A. Cones contain rhodopsin

B. Rods contain cyanolabe

C. Cones contain cyanolabe, chlorolabe, and erythrolabe

D. Cones contain rhodopsin

The idea being tested is that cones have three different photopigments, each tuned to a different part of the spectrum, which together provide color vision. In humans, cones carry cyanolabe (blue-sensitive pigment), chlorolabe (green-sensitive), and erythrolabe (red-sensitive). This trio lets the visual system compare the signals from the blue, green, and red channels to distinguish colors. Rods, on the other hand, use a different pigment called rhodopsin and are responsible for vision in low light, not color vision. So the statement that cones contain cyanolabe, chlorolabe, and erythrolabe best describes cone photopigment distribution.

4. Which photoreceptor type tends to have more photoreceptors connected to a single post-synaptic bipolar cell?

A. Cones

B. Both equally

C. Neither

D. Rods

Convergence in the retina shapes how much light from many photoreceptors is pooled into a single bipolar cell. Rods have high convergence: many rods feed into relatively few rod-bipolar cells. This pooling boosts sensitivity in dim light, but it reduces spatial detail. Cones, especially in the fovea, connect more sparsely, often near one-to-one with bipolar cells, preserving high acuity and color discrimination. So the photoreceptor type that tends to have more photoreceptors connected to a single post-synaptic bipolar cell is rods.

5. Under photopic conditions, two 5-quanta flashes cause how many ganglion cells to reach threshold?

A. 1

B. 2

C. 3

D. 4

Under photopic vision, cones provide high-acuity, low-convergence signaling. Each cone's input is carried forward through pathways that preserve spatial detail, so there is nearly a one-to-one relationship between active cones and the ganglion cells that respond to them, especially in the central retina. A 5-quanta flash is sufficient to activate a cone, and that cone's signal can drive its corresponding ganglion cell to threshold. If two flashes illuminate two separate cones, two distinct cone-to-ganglion-cell pathways reach threshold, producing two active ganglion cells. So, the number of ganglion cells reaching threshold matches the number of distinct cones activated by the flashes—two in this case.

6. Which two cell types are the main contributors to the ERG signal?

A. Ganglion cells and Amacrine cells

B. Müller cells and RPE

C. Photoreceptors and bipolar cells

D. Photoreceptors and Ganglion cells

The ERG reflects the summed electrical activity of the retina in response to light. The initial negative-going deflection, the a-wave, comes from photoreceptors as they hyperpolarize when stimulated. The following large positive deflection, the b-wave, mainly arises from bipolar cells—especially ON-type bipolar cells—with Müller glia shaping the extracellular signal. Other cells contribute to additional waveforms (for example, RPE-related components under some conditions or later activity from ganglion/amacrine cells), but the principal generators of the standard ERG signal are photoreceptors and bipolar cells.

7. What is the approximate threshold potential commonly cited for triggering an action potential in neurons?

A. -70 mV

B. -40 mV

C. 0 mV

D. -50 mV

Threshold is the depolarization level at which the action potential is triggered. For many neurons, the resting potential sits around -70 mV, and depolarizing to about -50 mV opens enough voltage-gated Na+ channels to start the rapid, self-reinforcing influx of Na+ that drives the spike. That's why -50 mV is commonly cited as the threshold. If the depolarization doesn't reach this level, the stimulus remains subthreshold and no action potential occurs. Resting at -70 mV would not trigger an AP, and 0 mV is far beyond the threshold and represents the spike phase rather than its initiation.

8. When light hits a rod, what substance absorbs the photons?

A. Photopsin

B. Rhodopsin

C. Retinal

D. Opsin

Rods detect light using a single photopigment called rhodopsin. This pigment sits in the outer segment of the rod and is a complex of the protein opsin bound to a light-sensitive molecule called retinal. When a photon enters, retinal absorbs the light and changes shape, which activates opsin and kickstarts the phototransduction cascade. Because rhodopsin is the light-absorbing pigment in rods, it is the substance that directly absorbs the photons. (Retinal is the part of rhodopsin that actually absorbs the light, but the overall absorber in the rod is rhodopsin.) Photopsin is the pigment used by cones, and opsin is just the protein component of rhodopsin.

9. How is the spectral sensitivity function for scotopic and photopic vision obtained?

A. Sum of absorption spectra

B. Reciprocal of thresholds

C. Difference of thresholds

D. Product of thresholds

The idea being tested is how we quantify how sensitive the eye is to light across different wavelengths. To build the spectral sensitivity function, researchers measure the smallest amount of light (the detection threshold) needed at each wavelength under the appropriate lighting conditions (scotopic for rod-dominated, low light; photopic for cone-dominated, brighter light). The crucial step is turning those thresholds into a sensitivity measure: sensitivity increases as the threshold decreases, so it is defined as the reciprocal of the threshold. In other words, if it takes less light to detect a wavelength, the sensitivity at that wavelength is higher, and the reciprocal captures that relationship. By computing this reciprocal for every wavelength and normalizing, you obtain the spectral sensitivity function for both scotopic and photopic vision, reflecting how rods and cones tune to different colors. The other options don't reflect how detection probability changes with wavelength—adding, subtracting, or multiplying thresholds doesn't produce a meaningful measure of sensitivity.

10. What do discs in rods and cones contain?

A. Nucleic acids

B. Photopigments

C. Lipids

D. Proteins

Discs in the outer segments of rods and cones are where light detection happens because they are packed with photopigment molecules. These pigments—rhodopsin in rods and photopsins in cones (each bound to retinal)—absorb photons and start the chemical cascade that turns light into an electrical signal for the brain. While the discs are membranes rich in proteins and lipids, their defining feature is the presence of photopigments, which are the actual light-absorbing components that enable vision.

Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

https://photoreceptors.examzify.com

We wish you the very best on your exam journey. You've got this!